CLAIMS

What is claimed is:

1.   A method of operating a data processing system, said method comprising:

establishing one or more monitoring parameter sets in a processing unit within the data processing system;

the processing unit monitoring, in hardware, execution of each of a plurality of schedulable software entities within the processing unit in accordance with a monitoring parameter set among the one or more monitoring parameter sets; and

the processing unit reporting to software executing in the data processing system utilization of hardware resources by each of the plurality of schedulable software entities.

2.   The method of Claim 1, wherein said establishing a monitoring parameter set comprises the processing unit receiving said monitoring parameter set from said software and storing said monitoring parameter set in said processing unit.

3.   The method of Claim 1, wherein said reporting comprises said processing unit interrupting said software.

4.   The method of Claim 1, wherein establishing a monitoring parameter set comprises receiving from software information identifying an instruction type to be detected and a number of instructions to be detected of the instruction type.

5.   The method of Claim 1, wherein:

the software comprises an operating system;

the method further comprises the operating system scheduling one or more schedulable software entities for execution within the processing unit in accordance with the utilization of hardware resources by each of the plurality of schedulable software entities reported by the processing unit.

6.   The method of Claim 1, and further comprising:

the software generating a respective classification of each of the plurality of schedulable software entities; and

the software storing the classifications in association with identifiers of the respective schedulable software entities.

7.   The method of Claim 6, wherein:

the software comprises an operating system; and

the method further comprises the operating system scheduling the one more schedulable software entities by reference to the stored classifications.

8.   The method of Claim 6, and further comprising:

the software communicating to the processing unit a classification of at least one executing schedulable software entity; and

in response to receipt of the classification by the processing unit, the processing unit dynamically modifying an allocation of hardware resources to the schedulable software entity.

9.   The method of Claim 8, wherein:

the schedulable software entity is a first schedulable software entity;

said method further includes the processing unit concurrently executing instructions within the first schedulable software entity and a second schedulable software entity; and

modifying an allocation of resources includes increasing an allocation to said second schedulable software entity of a hardware resource shared by said first and said second schedulable software entities.

10. A data processing system, comprising:

data storage;

one or more processing units coupled to said data storage, wherein a processing unit among said one or more processing units includes:

one or more execution units that execute instructions;

instruction fetch and dispatch circuitry that supplies instructions to said one or more execution units for execution;

a hardware monitor that, responsive to one or more monitoring parameter sets, monitors, in hardware, execution of each of a plurality of schedulable software entities within the processing unit in accordance with a monitoring parameter set among the one or more monitoring parameter sets and reports to software executing in the data processing system utilization of hardware resources by each of the plurality of schedulable software entities.

11. The data processing system of Claim 10, wherein said hardware monitor includes storage for the one more monitoring parameter sets, and wherein hardware monitor stores at least one monitoring parameter set within the storage for the one or more monitoring parameter sets in response to receipt of said monitoring parameter set from said software.

12. The data processing system of Claim 10, wherein said hardware monitor reports said utilization of hardware resources by interrupting said software.

13.   The data processing system of Claim 10, wherein at least one of said one or more monitoring parameter sets comprises information identifying an instruction type to be detected and a number of instructions to be detected of the instruction type.

14.   The data processing system of Claim 10, wherein:

the software includes an operating system;

said data processing system further includes the software within the data storage; and

the operating system schedules one or more schedulable software entities for execution within the processing unit in accordance with the utilization of hardware resources by each of the plurality of schedulable software entities reported by the processing unit.

15.   The data processing system of Claim 10, and further comprising:

the software, wherein the software is stored within the data storage, and wherein the software generates a respective classification of each of the plurality of schedulable software entities and stores the classifications in association with identifiers of the respective schedulable software entities.

16.   The data processing system of Claim 15, wherein:

the software comprises an operating system; and

the operating system schedules the one more schedulable software entities by reference to the stored classifications.

17.   The data processing system of Claim 15, wherein:

the software communicates to the processing unit a classification of at least one executing schedulable software entity; and

the processing unit includes a resource manager that, responsive to receipt of the

classification by the processing unit, dynamically modifies an allocation of hardware resources to the schedulable software entity.

18.   The data processing system of Claim 17, wherein:

the schedulable software entity is a first schedulable software entity;

the processing unit concurrently executes instructions within the first schedulable software entity and a second schedulable software entity; and

the resource manager modifies an allocation of resources by increasing an allocation to said second schedulable software entity of a hardware resource shared by said first and said second schedulable software entities.

19.   A processing unit for a data processing system, said processing unit comprising:

one or more execution units that execute instructions;

instruction fetch and dispatch circuitry that supplies instructions to said one or more execution units for execution; and

a hardware monitor that, responsive to one or more monitoring parameter sets, monitors, in hardware, execution of each of a plurality of schedulable software entities within the processing unit in accordance with a monitoring parameter set among the one or more monitoring parameter sets and reports to software executing in the data processing system utilization of hardware resources by each of the plurality of schedulable software entities.

20.   The processing unit of Claim 19, wherein said hardware monitor includes storage for the one more monitoring parameter sets, and wherein hardware monitor stores at least one monitoring parameter set within the storage for the one or more monitoring parameter sets in response to receipt of said monitoring parameter set from said software.

21.   The processing unit of Claim 19, wherein said hardware monitor reports said utilization of hardware resources by interrupting said software.

22.   The processing unit of Claim 19, wherein at least one of said one or more monitoring parameter sets comprises information identifying an instruction type to be detected and a number of instructions to be detected of the instruction type.